

the only part of the chain that comes in contact with the fertilizer, reducing the power required to operate it to a nominal amount.

The boxes or housings M M, which cover each feed-opening, have sides *n n*, which come down to the bottom of the hopper, leaving only an opening just large enough for the fingers on the sprocket-chain to pass through. These housings are of sufficient width or length to cover one finger on each side of the feed-opening, so that between the feed-openings L and the sides of the housings *n n* there will always be a finger to block the openings and prevent the leaking of the fertilizer when the chain is not in motion.

To thoroughly stir the fertilizer and insure a positive feed, the agitators S are used, which consist of armed wheels journaled to the vertical sides of the box and revolving in a vertical or upright position preferably about six inches in diameter, and so located that their teeth engage with the fingers of the sprocket-chain, whereby they are revolved. One of these agitating-wheels S is placed before each housing covering a feed-opening. The movement of the sprocket-chain revolves the agitators S, stirring the fertilizer and keeping a constant supply in position to be acted upon by the fingers on the chain, producing a positive and constant feed and preventing the tunneling under of the fertilizer.

In order to oil the sprocket-wheels D and E, I provide an opening in the covering O immediately over or a little to one side of the upper end of the stud or pin *a*, in which fits a thumb-screw X, Fig. 2. Oil dropped through this opening passes down along the pin *a* and oils it, and the bearings and the thumb-screw protect it from the fertilizer.

The operation of the feeding device will be sufficiently evident from the foregoing description. The fingers on the sprocket-chain carry between each other the proper amount of fertilizer and deliver it to the feed-openings as the sprocket-chain is propelled by means of the beveled gearing in connection with the driving wheels or axle or the grain feed-shaft. The discharge-openings remain always open. The amount of feed is regulated by varying the speed of the chain. Every portion of the sprocket-wheel except the fingers is covered, as described, so that it is extremely difficult for fertilizer to leak through into the feed-openings when the machine is not in operation, and the power required to operate the sprocket-chain is reduced to a minimum. The fingers of the sprocket-chain rotate the agitator-wheels S and keep a constant supply of fertilizer in front of each feed-discharge opening to be fed constantly and positively, said agitators being rotated with little or no increase of power.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a grain-drill, the combination, with a

fertilizer-hopper and constantly-open feed-openings therefor, of an endless sprocket-chain carrying fingers projecting out therefrom with boxes or housings covering the feed-openings of a length sufficient to cover one of the sprocket-fingers on each side of said openings to prevent the leaking of fertilizer when the chain is not in operation, substantially as shown and described.

2. In a grain-drill the combination, with a fertilizer-hopper and a staggered series of feed-openings therefor, of an endless sprocket-chain carrying fingers projecting therefrom, with boxes covering the feed-openings under and through which the sprocket-chain is carried substantially as shown and described.

3. In a grain-drill, the combination with a fertilizer-hopper having a staggered series of feed-openings, of an endless sprocket-chain, with sprocket-wheels therefor journaled horizontally in said hopper, said sprocket-chain carrying projecting fingers, boxes covering the feed-openings, central guide-piece for the sprocket-chain, with cover therefor, extending down over the sprocket-chain whereby all of the sprocket-chain is protected from the fertilizer except the projecting fingers, substantially as shown and described.

4. In a grain-drill, the combination with a fertilizer-hopper and a staggered series of feed-openings therefor, of an endless sprocket-chain, with sprocket-wheels therefor journaled horizontally in said hopper, said sprocket-chain carrying projecting fingers, boxes covering the feed-openings and housings covering the sprocket-wheels, central guide-piece for the sprocket-chain with cover therefor extending down over the sprocket-chain and beveled gearing underneath said hopper for driving said sprocket-chain, substantially as shown and described.

5. In a grain-drill the combination with a fertilizer-hopper, of an endless sprocket-chain moving along the bottom of the hopper said chain having horizontal fingers attached to the lower part of each link to extend out from under the housings covering the chain and engage and move the fertilizer to the feed-openings, substantially as shown and described.

6. In a grain-drill the combination with a fertilizer-hopper, sprocket-wheels journaled horizontally on the bottom of the hopper and carrying an endless sprocket-chain with horizontally-extending fingers, the sprocket wheels and chain being protected from the fertilizer by coverings or housings, substantially as and for the purpose described.

7. In a grain-drill the combination with a fertilizer-hopper, sprocket-wheels journaled horizontally on the bottom of the hopper and carrying an endless sprocket-chain with horizontally-extending fingers, the sprocket wheels and chain being protected from the fertilizer by coverings or housings, said housings over the sprocket-wheels being provided